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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/591,056

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Ryou Terao

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03/30/2011

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EXAMINER

WOLLSCHLAGER, JEFFREY MICHAEL

ART UNIT

PAPER NUMBER

1742

NOTIFICATION DATE

DELIVERY MODE

03/30/2011

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/591,056	<b>Applicant(s)</b> TERAO ET AL.	
	<b>Examiner</b> JEFFREY WOLLSCHLAGER	<b>Art Unit</b> 1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 24 January 2011.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 6-19 is/are pending in the application.
- 4a) Of the above claim(s) 15-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

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## DETAILED ACTION

### *Response to Amendment*

Applicant's amendment to the claims filed January 24, 2011 has been entered. Claim 1 is currently amended. Claims 15-19 remain withdrawn from consideration. Claim 5 has been canceled. Claims 1-4 and 6-14 are under examination.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-4, 6-11 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ford (US 5,213,737) in view of Tsurata et al. (US 2002/0014710) and any one of Nishisato (JP60-204302, IDS document) or Takasaki et al. (US 6,495,260) or Eastin et al. (US 6,939,383).

Regarding claims 1-4, 6-11 and 14, Ford et al. teach the basic claimed process of extruding a ceramic article comprising extruding the material in an extrusion molding machine in which a discharge outlet of a twin screw extruder and a material feed opening of a single screw

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extruder are connected (Abstract; col. 5, line 60-col. 6, line 10; Figure 1) and extruding the material through a die (Figure 1). Ford et al. do not explicitly teach extruding the ceramic sheet through a die that produces a sheet with a thickness of from 1 to 10 mm or that the twin screw extruder has a kneading portion with kneading elements occupying 30 to 70 vol. % of the twin extruder

However, Tsurata et al. teach a method for molding a ceramic sheet comprising extruding a ceramic material through a two stage extruder system wherein the discharge of the first extruder is connected to the feed opening of the second extruder and the material is extruded through a die to produce a sheet that is up to about 1.5 mm thick (paragraph [0034]; Figures 1-4).

Further, Nishisato teaches an analogous method which shows an arrangement suggesting kneading blocks within the claimed range (Figures 3, 4 and 7); Takasaki et al. teach an analogous method of extruding a composition containing from 60-92% of inorganic filler, such as a silicon nitride - a ceramic, (col. 4, lines 4-15) in a twin screw extruder containing a kneading portion that occupies 50% of the extruder (Example 4); and Eastin et al. teach a method of extruding powdered materials (col. 1, line 53-col. 2, line 21) and make it clear that the configuration and use of kneading/mixing elements selected can be arranged, as is known, in various combinations, as required, to facilitate the required mixing and advancing action and that the size and scope of the flights (i.e. mixing and advancing elements) are selected to provide a uniform mixture (col. 7, lines 14-30 and col. 7, line 55-col. 8, line 8).

Therefore it would have been *prima facie* obvious to one having ordinary skill in the art at the time of the claimed invention to have combined the teaching of Ford et al. with Tsurata et al. and to have used the process of Ford et al. to extrude a sheet having a thickness of up to 1.5 mm since Ford et al. teach and suggest their method is well suited for extruding ceramic powder

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materials Tsurata et al. suggest the extruded ceramic in sheet forms within the claimed range of thickness are known to be suited for a variety of applications.

Further, it would have been *prima facie* obvious to one having ordinary skill in the art at the time of the claimed invention to have modified the teaching of Ford et al. and to have employed a twin extruder having a kneading portion, including a kneading portion within the claimed range, as suggested by any one of Nishisato, Takasaki et al., or Eastin et al., for the purpose, as suggested, by Nishisato of producing an extruded article in an art recognized suitable manner, or the for the purpose, as suggested by Takasaki et al., of producing an extruded article in an art recognized suitable manner with an extruder suited for extruding analogous compositions. Further still, it would have been obvious in view of the teaching of Eastin et al. regarding the result effective nature of the mixing/kneading and advancing elements to have determined the optimal combination of elements through routine experimentation. Claims 2-4 and 6-11, do not appear to claim any features not disclosed or rendered obvious in view of the applied art. For example, Ford et al. employ a vacuum between the extruders (Figure 1).

Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ford (US 5,213,737) in view of Tsurata et al. (US 2002/0014710) and any one of Nishisato (JP60-204302, IDS document) or Takasaki et al. (US 6,495,260) or Eastin et al. (US 6,939,383), as applied to claims 1-4, 6-11 and 14 above, and further in view of JP 2000-238023.

As to claims 12 and 13, the combination teaches the method set forth above. Ford does not teach the ceramic is aluminum nitride. However, JP2000-238023 teaches an analogous method of extruding aluminum nitride powder in sheet form wherein the sheet has a thickness of 1.175 mm (Abstract; Example).

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Therefore it would have been *prima facie* obvious to one having ordinary skill in the art at the time of the claimed invention to have modified the ceramic extrusion method of Ford and to have extruded the ceramic aluminum nitride, as suggested by JP 2000-238023, since JP 2000-238023 suggests that aluminum nitride is a ceramic well suited for extrusion processes and is a suitable ceramic for certain ceramic applications. One having ordinary skill would have been motivated to employ materials known to be suited for extrusion and for use in various applications in the method of Ford for additional commercial applications of the method.

### ***Response to Arguments***

Applicant's arguments filed January 24, 2011 have been fully considered, but they are not persuasive. Applicant argues that JP '302 is not sufficient to teach the claimed range. This argument is not persuasive. The examiner notes that the cited Figures are understood in the context of the applicable disclosure. Namely JP '302's improvement over the prior art (Figures 1 and 2) is to introduce kneading elements (Figures 3 and 4). The kneading elements in Figure 4 show the screw "from its halfway position to the front end" (page 8). The entire disclosure suggests that the kneading elements are a result effective variable for improving the extrusion of ceramic materials. It follows therefore that one having ordinary skill would have readily determined and optimized, through routine experimentation, in view of the teaching of JP '302, the vol% of the kneading portion. Similarly, the other secondary references suggest optimizing the vol%. Further still, Takasaki is employed in combination with Ford and Tsurata et al. and is not applied as teaching the argued limitations (e.g. feeding a single screw extruder). Finally, applicant argues unexpected results in view of the claimed 30-70% range, pointing to Comparative Example 2 (previously Example 2) showing a crack designation of "2" and examples 1 and 3 showing a crack designation of "3". However, it is noted that a vol% of 70%

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is also employed in Examples 7, 14, 16, 17, 19, and 20 and these examples have a crack designation of "2" as well. For example, experiment 14 is performed at atmospheric pressure, but with the kneading portion within the claimed range, and achieves the same results as comparative example 2 which has a kneading portion outside of the claimed range.

Further, the disclosure states that a crack designation of "2" or "3" guarantees the reliability of a circuit board (paragraph [0096]). Further still, it is noted that a crack designation of "2" "has cracking resistance" and meets the amended limitation. Further still, there is no evidence showing criticality over the fully claimed range of 30-70% in that there are data points at 70%, 1 data point at 80% which produces acceptable results, 1 data point at 30%, and no data points in between 30-70% or below 30%. The conclusion follows that there is no persuasive evidence of record to suggest that the claimed range provides an unexpected result as opposed to a result that would have been readily determined through routine experimentation as set forth in the rejection above.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JEFFREY WOLLSCHLAGER whose telephone number is (571)272-8937. The examiner can normally be reached on Monday - Thursday 6:45 - 4:15, alternating Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on 571-272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jeff Wollschlager/  
Primary Examiner  
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March 25, 2011